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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/065,624

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Edward Jobson

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EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/065,624	<b>Applicant(s)</b> JOBSON ET AL.	
	<b>Examiner</b> TU M. NGUYEN	<b>Art Unit</b> 3748	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 June 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 36-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 36-39 and 46-49 is/are rejected.
- 7) ☒ Claim(s) 40-45 and 50-55 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. An Applicant's Request for Continued Examination (RCE) filed on June 1, 2010 has been entered. Per instruction from the RCE, an enclosed Applicant's Amendment has been entered. Claims 36 and 46 have been amended. Overall, claims 36-55 are pending in this application.

#### ***Drawings***

2. The formal drawing of Figure 6 filed on October 9, 2007 has been approved for entry.

#### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 36, 38, 39, 46, 48, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aine (U.S. Patent 3,903,694) in view of Henis et al. (U.S. Patent 4,230,463) and Kato et al. (U.S. Patent 5,953,907).**

Art Unit: 3748

Re claims 36 and 46, as shown in Figures 1-2, Aine discloses a device and a method for reducing an amount of a gas component ( $\text{NO}_2$ ) in an exhaust gas flow of a combustion engine (2), the method comprising steps of:

- feeding the exhaust gas flow from the engine to a separation unit (6);
- separating in the separation unit the gas component ( $\text{NO}_2$ ) from the exhaust gas flow, the gas component being constituted by an oxide of nitrogen ( $\text{NO}_x$  compound) present in the exhaust gas flow, in a wall structure (12) comprising material (lines 43-63 of column 4) which provides a selective passage of the gas component before other gas components (nitrogen, oxygen, CO) in the exhaust gas flow; and
- returning the separated gas component to an inlet (3) of the engine via a conduit, the gas component including fresh air as a carrier gas for the gas component (as clearly shown in Figure 1).

Aine, however, fails to specifically disclose that the engine is adapted for operation by a lean air/fuel mixture; that the wall structure is a porous material which provides a selective passage of the gas component through the wall structure based on molecular size and molecular form; and that the method further comprises a step of detecting an amount of the oxide of nitrogen in the exhaust gas flow for controlling the amount of the gas component present in the exhaust gas flow.

Aine discloses the claimed invention except for applying the invention to a lean air-fuel ratio burning engine. It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the invention of Aine to a lean burning type engine, since the recitation of such amounts to an intended use statement. Note that all internal combustion

Art Unit: 3748

engines that utilize a hydrocarbon compound as a fuel and air as a source of oxygen generate exhaust gases containing harmful emissions of HC, NO<sub>x</sub>, soot, CO, etc, that require purification before the gases can be released to the atmosphere; and the mere selection of the purification system of Aine for use in a lean air-fuel ratio burning engine would be well within the level of ordinary skill in the art.

As indicated in the Abstract and on lines 19-43 of column 13, Henis et al. teach multi-component membranes for gas separations by permeation, wherein the membranes comprise a coating in occluding contact with a porous separation membrane such that the membranes, exhibiting less resistance to permeate gas flow for the at least one gas component than for the remaining gas components in a gaseous mixture, provide a selective passage of said at least one gas component through the wall structure based on molecular size and molecular form. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the multi-component membranes taught by Henis et al. in the separation unit in Aine, since the use thereof would have been routinely practiced by those with ordinary skill in the art to effectively separate a gas component from a gaseous mixture.

As shown in Figure 1, Kato et al. disclose a method of controlling an engine exhaust gas system, wherein the system comprising a NO<sub>x</sub> catalyst (30) and a NO<sub>x</sub> sensor (40) located downstream of the catalyst. As indicated on lines 46-61 of column 3, Kato et al. teach that it is conventional in the art to utilize the NO<sub>x</sub> sensor to detect an amount of NO<sub>x</sub> in an exhaust gas stream, wherein when the detected amount reaches a predetermined value, a fuel injection quantity control section controls a fuel injection into the engine so that the air-fuel ratio of a mixture supplied to the engine is at a stoichiometric or rich condition for the efficient reduction

Art Unit: 3748

of NOx at the catalyst in order to reduce an amount of NOx present in the exhaust gas stream. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NOx sensor taught by Kato et al. to control a flow of air into the separation unit in Aine, since the use thereof would have been routinely practiced by those with ordinary skill in the art to remove harmful NOx emissions in an exhaust gas stream.

Re claims 38 and 48, in the modified method and device of Aine, as taught by Kato et al., the method further includes an additional step of supplying a reducing agent depending on the detected amount of the oxide of nitrogen (in Kato et al., a rich air-fuel mixture supplied to the engine results in excess unburned HC and CO in the exhaust gas).

Re claims 39 and 49, in the modified method and device of Aine, as taught by Kato et al. (lines 9-23 of column 5), the method further comprises a step of diagnosing a function regarding reduction of the oxide of nitrogen.

**5. Claims 37 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aine in view of Henis et al. and Kato et al. as applied to claims 36 and 46, respectively, above, and further in view of Casey (U.S. Patent 5,661,973).**

The modified device and method of Aine disclose the invention as cited above, however, fail to disclose that the engine is provided in connection with a turbo-aggregate with an exhaust gas turbine and a compressor for compression of air which has been fed into the engine, characterized in that an outlet conduit of the separation unit is connected to a point upstream of the compressor.

As shown in Figure 1, Casey discloses a fuel saving device for an internal combustion engine, comprising a separation unit (10) having a recovery chamber (22) for trapping residual

Art Unit: 3748

fuel components in an exhaust gas stream and returning the components to the engine via an outlet conduit (29). As indicated on lines 39-50 of column 3, Casey teaches that it is conventional in the art to return the residual fuel components to a turbo-aggregate with an exhaust gas turbine and a compressor for compression of air that has been fed into the engine, wherein the outlet conduit of the separation unit is connected to a point upstream of the compressor. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Casey in the modified device and method of Aine, since the use thereof would have been routinely practiced by those with ordinary skill in the art to effectively remove harmful emissions in the exhaust gas stream.

#### ***Allowable Subject Matter***

6. Claims 40-45 and 50-55 are objected to as being dependent upon a rejected base claim, but would be allowable if amend to overcome a claim objection outlined above and rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

7. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are moot in view of new ground(s) or rejection.

#### ***Prior Art***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of one patent: Wijmans (U.S. Patent 5,071,451) further discloses a state of the art.

Art Unit: 3748

*Communication*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tu M. Nguyen/

TMN

Tu M. Nguyen

July 18, 2010

Primary Examiner

Art Unit 3748